

- IN CONFIDENCE DRAFT -

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To: Steve Bosworth and Sung Kim
From: Sig Hecker
Subject: Quick-look heads up about DPRK visit
Date: Saturday, November 13, 2010

**Report of visit to a 2,000-centrifuge uranium enrichment plant and construction of a small Light-Water Reactor at the Yongbyon Nuclear Complex, Nov. 12, 2010.
Visit by Siegfried Hecker, John Lewis and Robert Carlin, Stanford University**

1) A 25 to 30 MW-electric (100 MW-thermal) experimental LWR is being constructed close to the 5 MWe gas-graphite reactor location at Yongbyon (Jack Pritchard was shown this site one week ago). We were told that since this is their first LWR design, they decided to build a small proto-type reactor to gain design, construction and operational experience before they build larger LWRs. The target date for operation of the proto-type LWR is 2012 (which appears much too optimistic). We were told that they will be able to produce all components indigenously and enrich and make their own fuel.

Current status: Excavation of the site to 7.1 meters deep was begun July 31, 2010, a concrete pad was poured and the containment shell of reinforced concrete is now taking shape. The containment structure is 22 m diameter, 0.9 m thick and will be 40 m high. It will contain 4 tonnes of uranium oxide fuel, enriched to 3.5 % U-235. It will generate electricity for the surrounding communities and be tied to the national grid.

2) At the fuel fabrication facility site, we were shown an industrial-scale uranium centrifuge enrichment facility across the street from the six-story uranium processing building. It was housed in a building with a cascade hall 100 m long, containing 2,000 centrifuges (we were told that number and it appears reasonable on the basis of our observations). It was a remarkable and unexpected sight from the observation windows of the second-floor control room. The centrifuges are all connected in cascades (we were told six cascades). The dimensions of the exterior casings appeared to be approximately 8 in. diameter by 6 ft tall. We were told that the rotor materials were alloys containing iron (their words) – which, mostly likely makes them P-2-like models with maraging steel rotors. We were also told that although they were patterned after URENCO and Japanese models, they were produced indigenously. The control room was ultra-modern with digital electronics, computers and flat-panel displays showing the cascade flow diagrams and process parameters. We were told that the facility was operating and was producing low-enriched uranium.

They started construction in April 2009. The capacity of the facility was claimed to be 8,000 kg-SWU. A preliminary calculation shows that this capacity is sufficient to produce 2 tonnes of uranium per year (ample for the small reactor). However, if it were reconfigured to make HEU, it could produce ~ 40 kg of 90% U-235 per year.

Additional detail will be provided later, along with a report of discussions with Ministry of Foreign Affairs officials about the motivation and policy implications. When questioned by news media at the Beijing airport upon our arrival this morning, we made a brief statement about the LWR construction. We do not plan to make the uranium enrichment information public until we brief you and other administration officials.