

# **JOINT STATEMENT**

**ON**

**MULTILATERAL COOPERATION ON**

**HIGH-DENSITY LOW-ENRICHED URANIUM FUEL DEVELOPMENT FOR  
HIGH-PERFORMANCE RESEARCH REACTORS**

**BELGIUM, FRANCE, GERMANY, REPUBLIC OF KOREA AND UNITED STATES**

We, the leaders of Belgium, France, Germany, the Republic of Korea and the United States, gathered in Washington on the occasion of the fourth Nuclear Security Summit, reaffirm our long-standing commitment to minimize highly-enriched uranium (HEU) in civilian uses where technically and economically feasible, as affirmed in the Washington, Seoul, and The Hague Summit Communiqués and as a part of our greater goal of continuously advancing nuclear security globally.

We also recognize the vital role that high performance research reactors play in scientific research, materials testing, and the production of medical radioisotopes, and that their high-value capabilities cannot be replaced by other currently existing tools.

We reaffirm our shared will to cooperate and ultimately convert the BR-2 reactor in Belgium, the RHF and RJH reactors in France, the FRM-2 reactor in Germany, and the MITR, MURR, NCNR, ATR, and HFIR reactors in the United States to LEU fuel as soon as technically and economically feasible.

While taking note of the significant value for our societies of these high-performance research reactors for scientific research, medicine and industry, as well as the necessary sustainment of the services they provide, we further recognize that, regarding the current state of technologies, these high performance research reactors require the use of HEU fuels to obtain neutron emission levels sufficient for their intended missions and, at this stage, cannot be converted to any of the currently-existing low-enriched uranium (LEU) fuels.

We recognize the importance of the continued operation of all the above mentioned reactors until such time as they are able to convert to LEU fuel, and commit to continued cooperation under present conditions.

On the occasion of the Seoul Nuclear Security Summit (2012), Belgium, France, the Republic of Korea and the United States issued a *Joint Statement on Quadrilateral Cooperation on High-density Low-enriched Uranium Fuel Production*. It was followed by a *Joint Statement on Multilateral Cooperation on High-density Low-Enriched Uranium Fuel Development*, issued by those four countries and Germany at The Hague Nuclear Security Summit (2014). Building on these statements,

we have been actively working together to develop and qualify new high-density LEU fuels and continue to do so.

We have focused our efforts on uranium-molybdenum (U-Mo) alloy, both as a monolithic fuel foil and as a metallic powder dispersed in an aluminum matrix. Since the 2012 and 2014 Summit Statements:

- The Republic of Korea has provided 100 kg of “atomized” (fine-grained, spherical) U-Mo powder for use in fabrication of LEU test fuels and has committed to produce and provide any additional powder needed for further qualification tests of new high-density dispersion fuels for these high performance reactors;
- Germany, France and Belgium, supported by the European Commission and in close cooperation with their US counterparts, continue to work together within the HERACLES consortium, focusing on testing and developing a U-Mo dispersion fuel; and,
- The United States is continuing its efforts to develop a U-Mo monolithic fuel, highlighted by the installation of a pilot commercial fuel fabrication line.

We recognize progress in the development of these fuels since the 2014 Summit, and note that continued progress will depend not only on continued political support, but also on sustained and significant levels of technical and financial support for these critical efforts. We recognize that any qualified new fuel must also be available on a commercial scale and have a viable back-end solution for its ultimate disposition.

To reach that ultimate goal, Belgium, France, Germany, the Republic of Korea and the United States pledge to pool the necessary expertise and technical and financial resources to develop, test and qualify new high-density LEU fuels. We further pledge to establish commercial fabrication and back-end capabilities so as to achieve the goal of converting the remaining high performance HEU-fueled research reactors as soon as possible once technically and economically feasible.

We also agree to cooperate, beyond scientific research, on the industrial pathway, so that as soon as a technically suitable LEU fuel is qualified and commercially available with technical performance and economic viability comparable to HEU for one or more of the above-mentioned nine high performance research reactors, the conversion process for the relevant facilities will be initiated.