



# Lightbridge

## White Paper



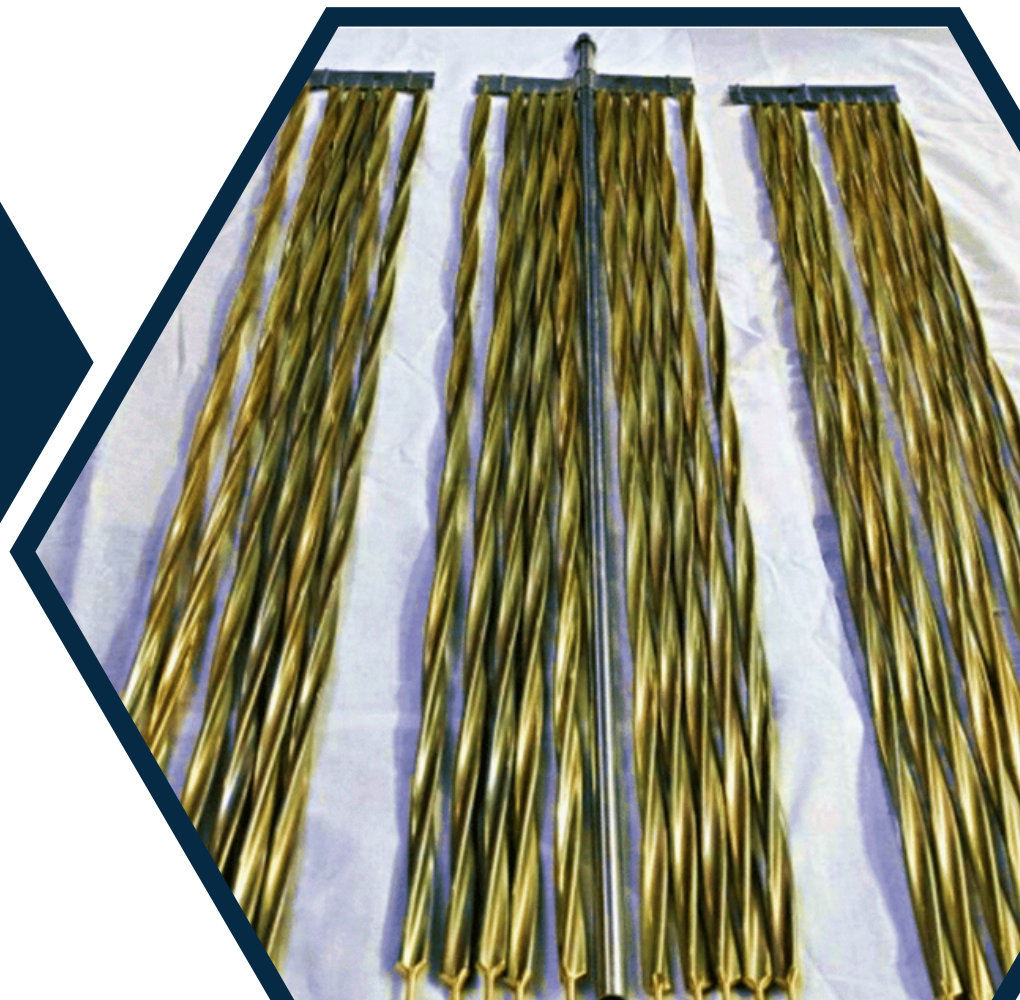
### Dispositioning Weapons-Grade Plutonium Using Lightbridge Fuel

June 2025

# About Lightbridge

Lightbridge Corporation (NASDAQ: LTBR) is focused on developing advanced nuclear fuel technology essential for delivering abundant, zero-emission, clean energy and providing energy security to the world. The Company is developing Lightbridge Fuel™, a proprietary next-generation nuclear fuel technology for existing light water reactors and pressurized heavy water reactors, significantly enhancing reactor safety, economics, and proliferation resistance. The Company is also developing Lightbridge Fuel for new small modular reactors (SMRs) to bring the same benefits plus load-following with renewables on a zero-carbon electric grid.

Lightbridge has entered into two long-term framework agreements with Battelle Energy Alliance, LLC, the United States Department of Energy's (DOE) operating contractor for Idaho National Laboratory (INL), the United States' lead nuclear energy research and development laboratory. DOE's Gateway for Accelerated Innovation in Nuclear (GAIN) program has twice awarded Lightbridge to support the development of Lightbridge Fuel over the past several years. Lightbridge is participating in two university-led studies through the DOE Nuclear Energy University Program at Massachusetts Institute of Technology and Texas A&M University. An extensive worldwide patent portfolio backs Lightbridge's innovative fuel technology. Lightbridge is included in the Russell 2000® Index and the Russell 3000® Index. For more information, please visit [www.ltbridge.com](http://www.ltbridge.com).



## **Dispositioning Weapons-Grade Plutonium Using Lightbridge Fuel**

On May 23rd, 2025, President Trump signed several Executive Orders (EO) aimed at re-invigorating America's nuclear energy industry. In these EOs, the President directs the Secretary of Energy to halt the surplus plutonium dilute and dispose program (except with respect to the Department of Energy's legal obligations to the State of South Carolina). The EOs further direct the Secretary of Energy to replace the "dilute and dispose" program with a plan to process surplus plutonium for fuel for advanced nuclear technologies.

Approximately one month into his second term, in February 2025, President Trump addressed the World Economic Forum in Davos by video and spoke of his desire for denuclearization with Russia and perhaps China. President Trump has reiterated his desire for denuclearization in several interviews.

The plutonium-disposing variant of Lightbridge Fuel is the best nuclear fuel technology to disposition surplus weapons-grade plutonium, meeting the goals of President Trump's EOs with regard to plutonium disposition, and playing a vital role in the President's denuclearization objectives.

### **Previous Unfulfilled U.S. - Russia Agreements and Current Opportunities Regarding Weapons-Grade Plutonium Disposition**

The United States and Russia signed legally binding agreements in 1998 and 2000 with the goal of disposing of 50 metric tons of plutonium from nuclear weapons and excess to defense requirements. In 2010, an amendment was executed that reduced the amount subject to disposition to 34 metric tons each. In 2016, Russia suspended the Agreement[1]. Despite entering into these agreements, Russia has not eliminated any of weapons-grade plutonium, and the U.S has only eliminated a tiny fraction of the agreed amount. Disposing of surplus plutonium would help ensure that Russia would not produce new nuclear weapons above numbers agreed to in treaties with the U.S.

When Joe Biden became President, Russia's President Putin wanted to extend the New START treaty by five years and President Biden agreed to do so without asking Russia for anything in return. The treaty is set to expire again on February 5, 2026, and there are indications that President Putin wants to extend it again. We believe that if President Trump agrees to do so, he could ask that Russia dispose of the

weapons-grade plutonium under the previous agreements that the U.S. and Russia signed in 1998 and 2000 but never acted on. We believe that it is possible that the U.S. could also bring China into negotiations.

### **Lightbridge Fuel for Weapons-Grade Plutonium Disposition**

Lightbridge metallic fuel is being developed for use in commercial nuclear reactors, where our uranium-based metallic alloy fuels offer significant economic, operational, and safety benefits to commercial nuclear power plants. In addition to our uranium-based alloys, Lightbridge's patented fuel technology and manufacturing processes also include plutonium-based fuel alloys. A recent simulation study performed at Virginia Commonwealth University and published in the leading peer-reviewed journal, Nuclear Technology, shows that a plutonium-based variant of Lightbridge fuel would consume 5.5 times as much plutonium per fuel rod as MOX, potentially providing a plutonium disposition solution which is capable of removing weapons-grade plutonium stockpiles more quickly and at a lower cost than the previously-considered MOX fuel systems.

Lightbridge is currently executing a fuel qualification program with fuel fabrication and testing activities at the Idaho National Laboratory, where the U.S. DOE provides support in the form of access to fabrication and test facilities, staff, and high-enriched uranium. The U.S. DOE further supports development of Lightbridge uranium-based fuels through two ongoing Nuclear Engineering University Program (NEUP) projects at Massachusetts Institute of Technology and Texas A&M University, that are evaluating the use of Lightbridge's uranium-based fuel in Small Modular Reactors. The plutonium variants of our fuel technology require further research and development.

### ***Lightbridge's Involvement in U.S. - Russia Cooperation for Plutonium Disposition***

Prior to 2014, the Lightbridge, with support of the U.S. government, worked in Russia developing and testing nuclear technology and employing former Soviet nuclear scientists and engineers, to ensure that they would not work for our adversaries such as North Korea and Iran. Lightbridge left Russia in 2014 when Russia invaded Ukraine and seized Crimea and the U.S. government and Lightbridge both wanted Lightbridge to leave Russia at that time. Lightbridge has not been engaged in Russia since then.

As a result of our collaboration prior to 2014, Russia has knowledge of the Lightbridge technology. In fact, Russia even produced samples of Lightbridge Fuel using Russian weapons-grade plutonium, at Siberian Chemical Combine. We believe the samples are still there and could be inserted into a test reactor in the event that President Trump secures Russian cooperation to dispose of weapons-grade plutonium as a quid pro quo for an extension of the New START Treaty.

More recently, Lightbridge met with the government owned nuclear company Rosatom in Dubai in 2021, where the number two person at Rosatom, Kirill Komarov (official title: First Deputy Director General for Corporate Development and International Business), tentatively agreed to a new cooperative agreement with Lightbridge; however, the cooperation never began since Russia again invaded Ukraine, and communications ceased. Later, the Russians got back in touch with Lightbridge with interest in revisiting cooperation on the fuel for weapons-grade plutonium disposition, but communications went silent again as the U.S. and Russia had differences in the spring of 2025.

## **Conclusion**

Reducing threats from nuclear weapons is an area where the U.S. and Russia have found ways to cooperate when they can find nothing else on which to agree. The international space station has been the other area of such cooperation, but it is scheduled to end in the next few years, leaving only nuclear arms control and nonproliferation as the potential area of cooperation when there is no other.

Senior personnel in Russia's nuclear energy sector have consistently indicated to Lightbridge their interest in a U.S.-Russia cooperation in elimination of weapons-grade plutonium. Considering that President Putin has expressed interest in renewing the New START Treaty once again, we believe that President Trump's administration may be well-positioned to be successful in obtaining agreement from President Putin to embark upon a renewed plutonium disposition program that puts the U.S. and Russian on track to honor previous and new commitments.



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